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## ORIGINAL

### ANALYSIS OF EXPERT PLAYERS' TRAINING PROCESS: VALIDATION OF TOOLS

### ANÁLISIS DEL PROCESO FORMATIVO EN JUGADORES EXPERTOS: VALIDACIÓN DE INSTRUMENTO

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#### **ABSTRACT**

The aim of this study was to create and validate a string of measurement tools (ATPEP), composed of two interviews and one scale, in order to identify and analyze expert team players' training process. This string of tools has been elaborated using an eclectic procedure (inductive and deductive). 11 experts judges led the validation process, and calculating content validity by obtaining Aiken's V coefficient. The discussed dimensions in both the interviews and the scale were the following: social context, sport context, inter-individual abilities,

intra-individual abilities, tactic, technique, fitness and anthropometry. Only 2 out of the 132 evaluated items obtained V values low enough to be removed. Finally, the ATPEP battery instruments were elaborated taking into account quantitative and qualitative experts' assessments.

**KEY WORDS:** collective sports, expertise, validation, player, interview.

## RESUMEN

El objetivo del presente estudio fue la creación y validación de una batería de instrumentos de medición (ATPEP), compuesta por dos entrevistas y una escala, para identificar y analizar el proceso de formación en jugadores expertos de deportes colectivos. La batería de instrumentos se ha elaborado siguiendo un procedimiento ecléctico (inductivo y deductivo). En el proceso de validación se utilizó el peritaje de expertos con 11 jueces, calculando la validez de contenido mediante la obtención del coeficiente V de Aiken. Las dimensiones abordadas en las entrevista y en la escala fueron: contexto social, contexto deportivo, habilidades interindividuales, habilidades intraindividuales, táctica, técnica, condición física y antropometría. Solamente 2 de los 132 ítems evaluados obtuvieron valores de V lo suficientemente bajos como para ser eliminados. La propuesta final de la batería de instrumentos ATPEP se ha elaborado teniendo en cuenta las valoraciones cualitativas y cuantitativas de los expertos.

**PALABRAS CLAVE:** deportes colectivos, pericia, validación, jugador, entrevista.

## INTRODUCTION

The study about the expertise, understood as the maximum knowledge of a subject, is nowadays a topic of great interest in the field of Sports. One of the first fields where this topic was studied was in chess, focusing attention on the moves selected by the best chess players in the world (Groot, 1965), which brought out the first theory elaborated about expertise (Simon & Chase, 1973), based on the theoretical framework of human information processing (Newell & Simon, 1972). Similarly, many of the methodological bases were established of what has come to be stated as the "Expertise Standpoint" (Ericsson and Smith, 1991). The first studies were held in the fields of vehicles driving or aircraft piloting, typing, mining, firefighters or military (Norman, 1988), music (Ericsson, Krampe, & Tesch-Römer, 1993, Hayes, 1981) or mathematics (Gustin, 1985). Finding the keys to become an expert constitutes one of the priority areas in Sport Sciences (Piéron, 1999). The concept of "expert", as well as "expert sportsman", has received a great number of definitions (Sánchez, 2002). Starkes (1993) claims that the expert performance is defined as the demonstration of a higher and more consistent performance level during a period of time.

To confirm someone as "expert" keeps generating controversy in the scientific community. Therefore, in studies whose samples are composed of experts,

candidates must fit the expert's profile required (Dunn, Bouffard & Rogers, 1999). Researchers must verify that the established sample-selecting criteria are rigorously enough to ensure that candidates are considered experts (Abraham, Collins & Martindale, 2006).

The main characteristic associated to experts based on the existing literature are the following (Jiménez & Lorenzo, 2008): specific knowledge of the field, deliberate practice and the 10-year rule (in that field), motivation beyond the field and commitment with the field.

If the object of study is the expert sportsman, two different sides have traditionally been identified regarding the determination of what is important and essential to achieve the expert condition, conditioning a subject with potential sporting talent to achieve the highest level. These sides are characterized, on the one hand, by genetic aspects, as Kissouras, Galadas and Koskolou (2007) defend, and on the other hand, by deliberate practice and optimum training to acquire the expert condition according to Ericsson (2007).

As a general rule, studies focused on the genetic side pay attention to identification and evaluation of anthropometric and biological aspects (Matsudo, 2003), trying to identify the ideal anthropometric profiles for each of the different sports (Sancesario & Rosales, 2006; Vila, Ferragut, Abalades, Rodríguez, & Argudo, 2010). In team sports, this sportsmen-with-talent selection criterion seems not to be the most appropriate, since those talent indicators can be false, because only aspects related to early maturation are associated with this skill (Helsen, Hodges, Winckel & Starkes, 2000). There are studies which shows no significant differences between biological and physiological parameters of both sportsmen who achieve success and those who do not. There are other factors to determine a sportsman's ability to get a job as a professional (Williams & Reilly, 2000).

Ericsson (2007), opposite to Kissouras et al. (2007), claims that elite sportsmen's characteristics are due to organism's adaptations to intense a repeated training. This practice also includes physiological changes that stimulate cells growing and transformation, which causes a greater adaptation of the physiological and brain systems to sport. In addition, Ericsson affirms that genetically all individuals can become expert players, but they are not due to lack of the needed deliberate practice and they abandon before that.

The sides abovementioned about the determination of how the subject becomes an expert are not exclusive. There are more and more authors who adopt a more integrated and holistic position, and who claims that success in any sport can be achieved not only for innate factors or intense training but also by environmental aspects (Côté, Baker & Abernethy, 2003; Côté, Salmela, Trudel & Baria, 1995; Elferink-Gemser, Visscher, Lemmink & Mulder, 2007; Sáenz-López, 2010). When identifying the talent as multidimensional aspect, what a person may have as a disadvantage can be compensated with another aspect (Davids, Lees, & Burwitz, 2000).

In an analogous manner, within the different lines of research on expertise or expert-novice paradigm, there are disagreements when determining what the best indicators are for the identification and characterization of talents in different sports (Goncalves, Rama and Figueiredo, 2012).

Many authors have wanted to express what factors must be considered for an athlete to reach elite. Of all of them, those proposed by Janelle and Hillman (2003) seem to be the most used by researchers. These are physiological, technical, cognitive and emotional factors.

The expert-novice paradigm has been approached with different methods that have traditionally been used in related studies. One of the existing research lines on this topic deals with the analysis of how experts have become experts by investigating sportsmen's own paths (Gustin, 1985; Hemery, 1991; Sáenz-López, Jiménez, Giménez & Ibáñez, 2007), quantifying the time spent training sport with the desire to improve or to be excellent (Ericsson et al., 1993), and/or studying the motivation that keeps them training (Scanlan, Stein & Ravizza, 1991a; Scanlan, Stein & Ravizza, 1991b).

Considering the nature of the subject, most of the researches made in this area are retrospective and descriptive. Longitudinal studies are those which best fit this type of research (Ibáñez, Saenz-Lopez, Feu, Giménez & García, 2010). Despite the drawbacks it entails, there is a qualitative methodological solution that guarantees certain diachrony and a holistic character in studies, which is used in the biographical method.

Many authors have shown the need to increase studies from a biographical perspective (own paths) with the aim of knowing how certain factors have an effect on the process to become expert (Housner & French, 1994; Singer & Janelle, 1999). Experts' biographical narratives are useful tools in order to explain their reactions in certain scenes (Goetz & Lecompte, 1988), since the interview is provided with a context where the interviewees can express themselves in their own words.

There are a great number of studies which support these statements and which use a biographical perspective for their research (Baker, Côté, & Abernethy, 2003; Côté et al., 2003; Hodges & Starkes, 1996; Salmela, 1995; Simon & Chase, 1973; Sánchez, 2011; Sánchez, 2002).

The biographical method uses the interview as the main measurement tool. This tool has been acquiring greater prominence when carrying out research in the field of Sport Sciences and Physical Education. Culver, Gilbert and Trudel (2003) analyzed all publications from 1990 to 1999 in three psychology magazines. From the 485 published articles, in 67 of them the interview was the measurement tool used.

Regarding the identification of the process to become expert players through a biographical method, with a sample formed by both players and people around them who have influence over this process (relatives, coaches, psychologists,

doctors, physical trainers...), there are a lot of sports in which this type of research has been done. Therefore, there are studies about athletics (Vernacchia, McGuire, Reardon, & Templin, 2000), swimming (Fiorese, Lopes & Jornada, 1999), fight (Hodges & Starkes, 1996) figure skating (Starkes, Deakin, Allard & Hodges, 1996), artistic gymnastics (Beamer, Côté & Ericsson, 1999), netball and hockey (Baker et al., 2003), basketball (Sánchez, 2002; Sáenz-López, Ibáñez, Giménez, Sierra & Sánchez, 2005), tennis (Carlson, 1988) and football (Pazo, 2010). The aim of these studies is to investigate and analyze the process to become experts through the participants' experience and perception (Sánchez, 2002). The measurement tools used (interviews) were different in all of them, as well as the validation processes they were subjected.

Reliability and validation criteria to elaborate measurement tools within the quantitative paradigm are appropriately defined and accepted by the scientific community. However, it is not the same with the qualitative paradigm due to the fact that this process suffers some changes (Golafshani, 2003; Straus & Corbin, 1990).

In some of the research that used the biographical method, the process carried out to validate the measurement tool consisted on their review by at least three expert researchers (Jiménez & Lorenzo, 2008; Pazo, 2010; Sáenz-López et al., 2005; Sánchez, 2001; Sánchez, 2002; Ureña, Alarcón & Ureña, 2008).

## **OBJECTIVES**

Since in each research different tools have been validated, the main aim of the present study is to elaborate and validate a string of measurement tools called Analysis of Expert Players' Training Process (AEPTP), which consists of two interviews and one scale in order to identify the process to become expert team players. One of the interviews is addressed to expert team players, and the other to the professionals involved in the process (coaches, doctors, physical trainers, coordinators, psychologists...).

The main aim of this study will be carried out by elaborating a tool which allows the analysis of common characteristics for the development of expert team players; on the contrary to what so far has been developed by specific tools for each sport. The suggestion to create measurement tools valid for all team sports is considered essential to establish a starting point. This is one of the two main points provided by the present study. Therefore, it favors the study of different sports with the same tool, which means the same criteria too, so researchers can compare and analyze data obtained in common regardless of the sport.

The process to validate tools will be carried out by estimating the Content validity coefficient  $V$  described by Aiken (1985) which is the most appropriate for this purpose (Escurra, 1988). This coefficient can be defined as a simple logical method to obtain content validity which is applied through a logical method: experts' opinion about assessment tools validity (Merino & Livia, 2009).

## METHOD

According to Montero and León (2007), the present study is considered an instrumental study aimed to the design and study of psychometric properties of measurement tools.

### Participants

The selection of participants who formed the sample of this study was carried out knowingly and intentionally. Experts were chosen according to the criteria established by the researcher (Rodríguez, Gil & García, 1996), as well as their accessibility (Valles, 2003). In all, subjects were required to be expert and accessible.

The sample used to validate the measurement tool was formed by 11 expert judges (Dunn et al., 1999; Lynn, 1986). The subjects selected to form the sample of expert judges must fulfill at least 5 of the 6 criteria established:

C1. To be a doctor.

C2. To be or to have been a professor at the University.

C3. To have a Level III Instructor Certification on team sports (national) or to have taught any subject about team sports in any faculty of sport sciences.

C4. To have 10 years of experience as a lecturer and/or as a trainer in both the first and second national levels.

C5. To have published articles related to qualitative methods.

C6. To have published articles with expert subjects or analyzing sport performance.

**Table 1** shows the criteria fulfilled by each of the expert judges.

Expert judges											
Criteria	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11
C1	X	X	X	X	X	X	X	X	X	X	X
C2	X	X	X	X	X	X	X	X	X	X	X
C3	X	X	X	X	X	X	X	X	X	X	X
C4	X	X	X	X	X	X	X	X	X	X	X
C5			X	X		X	X	X	X	X	X
C6	X	X	X	X	X	X	X	X		X	X

### Tool

The suggestion of the string of assessment tools (AEPTP) follows a thorough review of previous studies concerning the process to become experts which used the biographical method and whose measurement tool was the interview. This string of tools was elaborated using an eclectic procedure (inductive/deductive). The items from the interview and the scale were written up taking the tools used and the results obtained in previous researches as a reference (Jiménez & Lorenzo, 2008; Pazo, 2010; Sánchez, 2002), as well as



contributions from the Research Group to Optimization of Training and Performance Sports of the University of Extremadura.

## Interviews

Both interviews followed the same structure (Table 2). First of all, they include a presentation of the study, the main objectives and procedure protocols which will be carried out to develop the interview. After that, they explain guaranteed anonymity and silence regarding the answers provided. In addition, they ask the interviewee authorization to record the interview (Stake, 2010).

The interviews begin with a first section corresponding to verifying, correcting and obtaining biographical data and sporting achievements and background of the interviewee. This information will have been previously collected by the interviewer and presented to the subject in question so that it can be corroborated, corrected or enlarged.

**Table 2.** Structure of the interviews

Element	Aim of the questions
Section I	Biographical aspects and sports backgrounds
Section II	Assessment of the importance of each dimension. Identification of the most relevant factors in each of the dimensions. Way of working and improving such factors.
Section III	Identification of more dimensions. Identification of aspects typical of expert players. Recommendations for new players.

The second section is about asking questions aimed at obtaining more specific information about factors (Table 3) which have an effect on the process of becoming expert team players, who will be taken into account for the content analysis. They are classified on eight different dimensions, which are the following: social context, sports context, intra-individual abilities, inter-individual abilities, tactic, technique, physical abilities and anthropometry.

Within each dimension, the questions are distributed to obtain information in relation to three aspects: assessing the importance of each dimension, identifying the most relevant factors in each of the dimensions and the way of working and improving those factors.

The three previous factors are characteristic from the process to become an expert player.

Finally, the last section of the interview is called "Sportsman Excellence" and it is composed of general questions, not specific questions as in the previous sections. This time the aim is to identify the existence of more dimensions that can be included within the process to become expert players, the aspects common of an expert player and the recommendations they would tell to new players.

**Table 3.** Factors which form the dimensions of the Section II of the interview

Dimension	Factors
Social context	Education, studies, family, idols, means of communication, friends and boyfriend/girlfriend.
Sports context	Source of young players, coordinators, starts, trainers, doctors, opportunities, coaches, psychologists, talent scout, representatives, body care, experience, sport of sport in general, facilities and talent.
Intra-individual abilities	Level of activation, self-efficacy, learning ability, concentration, persistence, discipline, emotional balance, humility, motivation, pressure, initiatives, extroversion, mental strength and introversion.
Inter-individual abilities	Leadership, performed roles, socialization, empathy, solidarity, group connection, cohabitation, respect and comradeship.
Tactic	Making decisions, perception, polyvalence, offensive tactics actions without the ball, offensive tactics actions with the ball, defensive tactics and team systems and organization.
Technique	Defensive abilities, abilities with motive and abilities without motive.
Physical abilities	Resistance, speed, strength, flexibility, coordination, balance and agility.
Anthropometry	Body composition, size, height, weight and proportionality

### Scale

The third tool of the AEPTP string is a scale. A scale is defined as a group of verbal reagents to which an individual responds expressing levels of agreement or disagreement (Ángel, 2007). It is composed of a statement where the aim and structure are explained, as well as the instructions and recommendations to fulfill it appropriately. After that, there are the 8 dimensions which form the second section of the interviews followed by a graphic scale like Likert, ranges from 1 to 10, for the interview to value the importance of each dimension related to the importance of the process of becoming expert players, where 1 is the lowest mark and 10 the highest one.

### Analysis of data

In order to validate the AEPTP string under experts' assessments, we proceeded by calculating the content validity index  $V$  proposed by Aiken (1985) or better known as Aiken's  $V$  coefficient. This coefficient allows the content validity or the item importance regarding a content domain of  $N$  judges. Its magnitude ranges from 0.00 to 1.00, being the latter of the greatest magnitude, which indicates the perfect agreement among judges regarding the highest validity score of evaluated contents.

To obtain the content validity coefficient the algebraic equation modified by Penfield and Giacobbi (2004):



$$V = \frac{\bar{X} - l}{k}$$

Where  $\bar{x}$  is the sample mean which reflects judges' average score,  $l$  is the lowest score possible, and  $k$  is the difference between the highest and the lowest values of the Likert scale used. In this case, since the scale chosen for experts assessment is Likert from 1 to 10, the denominator of the formula would be  $k = 10 - 1 = 9$ .

To calculate this coefficient a free application designed in Visual Basic 6.0 language (Merino & Livia, 2009) was used, which calculates confidence intervals using the *score* method (Penfield & Giacobbi, 2004) at 90%, 95% and 99% levels. Confidence intervals are a way of expressing the degree of uncertainty associated with the results of an estimated value.

Aiken considered a null hypothesis fixed in  $V=0.50$ , so that all items with higher values would be accepted, while the items with values lower than 0.50 would be rejected.

For this study the levels used were those suggested by Ortega, Jiménez, Palao and Sainz (2008), where if the item obtains an average value of or higher than 8.1 it is kept; if it is between 8.0 and 7.1 it is changed; and if it is of 7.0 or lower it is removed. Considering the values of  $V$  for the average given above, if the item obtains a score of 0.79 or more, it is maintained. If the value of the item is between 0.78 and 0.68 it is changed; and if it is equal to or less than 0.69 it is removed. These values are more stringent than those proposed by Aiken (1985) and are to be used as a benchmark in this study.

## Procedure

First of all, after establishing some criteria to select experts, we proceeded contacting them. Then, they were sent a document with tow well defined parts. The first part is a formal and institutional presentation of the study, and the second part shows the changes from the initial proposal regarding the AEPTP string, which includes a table with the following elements (Table 4) after each of the elements which take part within the two interviews and the scale:

**Table 4.** Information attached to the items of the string in the document given to expert judges

Aspect to assess	Statement
Adequacy	To what extent do you consider that this element must be part of the interview?: (1-10):
Writing	To what extent do you consider that this element must be part of the interview?: (1-10):
Comments	

In addition, they were given instructions about how to asses, and they had to score "Adequacy" and "Writing" with the most appropriate value, according to them. The assessment was carried out thought a Likert scale ranged from 1 to 10, where 1 is the lowest score and 10 the highest. In addition, they had the option to express a qualitative assessment in the "Comments" section.

Finally, we collected data: one qualitative and two quantitative assessments per each of the items of the AEPTP string.

## RESULTS

The values obtained when calculating the content validity of the three elements which form the AEPTP string are shown below. Table 5 shows the results of the Aiken's *V* values obtained by the scale's elements.

**Table 5.** Results of Aiken's *V* coefficient for the scale's items

	Dimensions																			
	Pres.		Stat.		1		2		3		4		5		6		7		8	
	A	W	A	W	A	W	A	W	A	W	A	W	A	W	A	W	A	W	A	W
<i>M</i>	9.4	8.4	9.4	9	8.7	8.9	9	8.9	8.8	8.6	9.1	8.9	9.2	9	9.1	8.8	8.8	8.7	9.3	8.9
<i>V</i>	.93	.82	.93	.89	.86	.88	.89	.88	.87	.84	.90	.88	.91	.89	.90	.87	.87	.86	.92	.88

*M*: item's average value; *V*: Aiken's *V* coefficient; *A*: Adequacy; *W*: Writing; *Pres.*: presentation; *Stat.*: statement.

## DISCUSION

The main aim of this study was to create the string of measurement tools AEPTP composed of two interviews and a scale in order to identify and analyze the process of becoming expert team players, motivated by the great number of common characteristics among team sports. Therefore, the standardization of a tool to be used in studies with different team sports samples will allow their results comparison and assessment in a common way.

Table 6

Aiken's V coefficient results for items within players' interview according to Adequacy and Writing

Item		Section II																				Section III	
		Introduction		Section I		Social context		Sport context		Intraindividual abilities		Interindividual abilities		Tactic		Technique		Physical abilities		Anthropometry			
		M	V	M	V	M	V	M	V	M	V	M	V	M	V	M	V	M	V	M	V		
1	A	9.5	.95	8.9	.88	8.6	.85	9.5	.95	8.7	.86	8.2	.80	9.0	.89	9.0	.89	8.8	.87	8.9	.88	9.4	.93
	W	8.3	.81	8.2	.80	7.8	.76 *	8.6	.85 *	9.0	.89	6.6	.62 **	8.6	.85	8.9	.88	8.5	.84	8.2	.80	9.2	.91
2	A					8.8	.87	9.4	.93	8.6	.85	9.1	.90	9.5	.94	9.1	.90	9.5	.94	9.4	.93	9.7	.97
	W					7.8	.76 *	7.3	.70	7.3	.70 *	7.9	.77 *	8.5	.84	8.5	.84	9.1	.90	8.9	.88	9.5	.95
3	A					9.7	.97	9.4	.93	9.2	.91	8.3	.81	9.8	.98	9.7	.97	9.8	.98	9.7	.97	9.7	.97
	W					9.0	.89	9.1	.90	9.3	.92	7.7	.75 *	9.4	.93	9.5	.94	9.5	.94	9.3	.92	9.7	.97
4	A					9.4	.94	9.9	.99	7.9	.77 *	9.6	.96	9.5	.95	9.8	.98	9.4	.93	9.5	.94	9.2	.91
	W					8.7	.86	9.2	.91	7.1	.68 *	9.0	.89	9.5	.95	9.5	.95	9.5	.94	9.5	.94	9.6	.96
5	A					8.3	.81	9.8	.98	9.5	.95	9.9	.99	9.2	.91	9.4	.93	9.4	.93	8.9	.88	9.4	.93
	W					7.4	.71 *	7.8	.76 *	8.9	.88	9.5	.95	8.3	.81	8.5	.83	7.8	.76 *	7.5	.73 *	9.3	.92
6	A					9.5	.95	9.9	.99	9.9	.99	9.3	.92									9.7	.97
	W					8.8	.87	9.7	.97	9.5	.95	8.4	.82									9.7	.97
7	A					9.1	.90	9.4	.93	9.5	.95											9.2	.91
	W					8.1	.79	8.2	.80	8.5	.83											9.5	.95
8	A					9.1	.90	9.0	.89													9.5	.95
	W					8.5	.84	9.0	.89													9.4	.93
9	A					9.6	.95	8.9	.88														
	W					9.0	.89	8.3	.81														
10	A					8.2	.80	9.7	.97														
	W					6.8	.65 **	8.9	.88														
11	A							9.7	.97														
	W							8.9	.88														
12	A							9.9	.99														
	W							9.3	.92														

A: Adequacy; W: Writing; V: Aiken's V coefficient; M: arithmetic mean; \*: item to be modified; \*\*: item to be removed.

Table 7

Aiken's V coefficient results for items within the experts' interview according to Adequacy and Writing

Item		Introduction		Section I		Section II																Section III	
						Social context		Sports context		Intraindividual abilities		Interindividual abilities		Tactic		Technique		Physical abilities		Anthropometry			
M	V	M	V	M	V	M	V	M	V	M	V	M	V	M	V	M	V	M	V	M	V		
1	A	9.6	.96	9.3	.93	9.6	.96	9.8	.98	8.1	.79	9.2	.91	9.3	.92	9.3	.92	9.2	.91	9.3	.92	9.0	.89
	W	9.1	.90	9.0	.89	8.5	.84	9.1	.90	7.1	.68 *	9.3	.92	8.7	.86	9.2	.91	9.0	.89	8.8	.87	8.8	.87
2	A					9.5	.94	9.0	.89	9.0	.89	8.9	.88	9.7	.97	9.7	.97	9.7	.97	9.6	.96	9.8	.98
	W					8.5	.83	8.7	.86	8.5	.83	8.1	.79	9.7	.97	9.7	.97	9.7	.97	9.6	.96	9.6	.96
3	A					9.4	.93	9.4	.94	9.4	.93	9.3	.88	9.5	.95	9.5	.95	9.5	.95	9.5	.95	9.8	.98
	W					9.0	.89	8.2	.80	8.9	.88	8.1	.79	9.4	.93	9.4	.93	9.4	.93	9.4	.93	9.7	.97
4	A					9.0	.89	9.5	.94	9.3	.82	9.3	.92	9.7	.97	9.7	.97	9.5	.95	9.7	.97	9.2	.91
	W					8.5	.84	8.5	.83	8.9	.88	8.8	.87	9.4	.93	9.4	.93	9.2	.91	9.4	.93	9.5	.94
5	A					9.4	.93	9.2	.91	9.7	.97	9.2	.91	9.6	.96	9.6	.96	9.6	.96	9.1	.90	8.9	.88
	W					8.5	.84	7.7	.74 *	9.4	.93	8.7	.86	8.5	.83	8.5	.83	8.5	.84	7.7	.75 *	8.9	.88
6	A					9.8	.98	9.7	.97	9.3	.92	9.6	.96									9.9	.99
	W					9.8	.98	9.2	.91	8.4	.82	9.3	.92									9.9	.99
7	A					9.3	.92	9.5	.95													9.6	.96
	W					8.2	.80	9.3	.92													9.5	.95
8	A							9.1	.90													9.5	.94
	W							8.2	.80													9.5	.94

A= Adequacy, W= Writing, V= Aiken's V coefficient, M=arithmetic mean, \*= item to be modified, \*\*= item to be removed.

Dunn et al. (1999), in the field of Sports Psychology, establish several basic recommendations addressed to publications focused on the creation of a string of measurement tools when establishing and determining which ones are the methods used to determine content validity. Therefore, they recommend that authors pay special attention to (a) the criteria to select expert judges; (b) the number of judges to choose; (c) the procedure used by judges to assess content validity; (d) the statistical and quantitative procedures to evaluate judges' scores; and (e) the selection criteria used to determine whether items are kept, modified or removed of the final items proposal to be included in the questionnaire. The present study has followed these recommendations and has thoroughly described each of these aspects.

Lynn (1986) establishes that the lowest number of experts to assess the content validity of a tool should be 3 judges, while 5 is acceptable and 10 judges is the ideal number to assess a tool, since he claims it would be little difference in the assessment process with more than 10 experts. Along this line, authors such as Ortega et al. (2008) and Reyes (2010) obtain content validity of measurement tools in the field of Sports Sciences with 12, 9 and 10 expert judges respectively. Recent researches in the field of Psychology (Grimaldo, 2008; Mills, Butt & Maynard, 2012; Sotelo, Sotelo, Domínguez & Padilla, 2012) use 10 expert judges for the same task. The present study has a sample of 11 expert judges and it fulfills the requirements established in the literature regarding the number of experts.

Taking Ortega's et al. (2008) suggestion as a reference regarding the criterion determined to indicate whether items must or not take part in the string of tools AEPTP, from the 132 items to be assessed only 2 obtained values under  $V = 0.67$  (item n.10 from social context and item n.1 from inter-individual abilities). Both items are from the interview addressed to team players. In this interview there were also 11 items which obtained  $V$  values between 0.68 and 0.78, so they had to be modified (items 1, 2 and 5 from social context dimension, items 2 and 5 from the sports dimension, items 2 and 4 from inter-individual abilities dimension, item 5 from physical abilities dimension and item 5 from anthropometry).

From the interview addressed to experts only 3 items obtained  $V$  values to be modified (item 5 from sports context, item 1 from intra-individual abilities, item 5 from anthropometry). None of the items obtained values under 0.67. Regarding the scales' items, all obtained  $V$  values over 0.79. Therefore, from the 132 items to be assessed, 116 obtained  $V$  values over 0.79, so much higher than those proposed by Penfield and Giacobbi (2004).

The lowest scores given to some of the items (related to their Writing and not to their Adequacy) are attributable to a badly formulation of questions or to the lack of previous information given to experts about the tool. Therefore, these items were revised and modified for the final string of tools AEPTP.

As indicated by Bulgner and Housner (2007), qualitative assessments are essential when developing an instrument. In the assessments offered by the 11 expert judges in relation to the items that make up the string of instruments, it has been observed that they have emphasized the length of the document. Therefore, for the final design of the string of measurement tools AEPTP, there have been reduced items and it was intended to equalize the number of questions in each of the eight dimensions that make up the second section of interviews. This will manage to avoid future problems regarding the weight of data when carrying out the analysis of the data obtained by the tool.

As a result, of the 118 questions that initially made up the two interviews included in the string of tools AEPTP (63 in the players' interview and 55 in the experts' interview), items were reduced to 84 in the final proposal (44 and 40, respectively).

## **CONCLUSIONS**

Given that it has strictly complied with the recommendations made by Dunn et al. (1999) regarding the procedures required in researches which use experts' assessments to create tools, and the results obtained, we can conclude that the string of measurement tools AEPTP can be used to analyze the procees of becoming expert team players. This string of tools has items with high values regarding content validity through calculating Aiken's  $V$  coefficient (Annexes I, II and III).



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**Referencias propias de la revista / Journal's own references:** 3 (4,48%)

## ANNEX I

## AEPTP SCALE

Please indicate your views on the importance of the dimensions below regarding the process of becoming a high performance player by scoring them on a scale of 10 down to 1 (i.e. 10 = maximum importance; 1 = not relevant).

1. Social context: it includes factors such as education, studies, family, idols, means of communication, friends, boyfriend/girlfriend...  

1	2	3	4	5	6	7	8	9	10
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2. Sports context: it includes factors such as source of young players, coordinators, starts, trainers, doctors, opportunities, coaches, psychologists, talent scout, representatives, body care, experience, sport of sport in general, facilities and talent...  

1	2	3	4	5	6	7	8	9	10
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3. Intra-individual abilities: it includes factors such as level of activation, self-efficacy, learning ability, concentration, persistence, discipline, emotional balance, humility, motivation, pressure, initiatives, extroversion, mental strength and introversion...  

1	2	3	4	5	6	7	8	9	10
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4. Inter-individual abilities: it includes factors such as leadership, performed roles, socialization, empathy, solidarity, group connection, cohabitation, respect and comradeship...  

1	2	3	4	5	6	7	8	9	10
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5. Tactic: it includes factors such as making decisions, perception, polyvalence, offensive tactics actions without the ball, offensive tactics actions with the ball, defensive tactics and team systems and organization...  

1	2	3	4	5	6	7	8	9	10
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6. Technique: it includes factors such as defensive abilities, abilities with motive and abilities without motive...  

1	2	3	4	5	6	7	8	9	10
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7. Physical abilities: it includes factors such as resistance, speed, strength, flexibility, coordination, balance and agility...  

1	2	3	4	5	6	7	8	9	10
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8. Anthropometry: it includes factors such as body composition, size, height, weight and proportionality...  

1	2	3	4	5	6	7	8	9	10
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## ANNEX II

### AEPTP PLAYERS' INTERVIEW

Verifying, correcting and obtaining biographical data and labour and curricular background previously obtained by the interviewer about the interviewee.

#### SOCIAL CONTEXT

1. To what extent do you think the attitude of your family throughout your career has influenced your sports performance?
2. Who has been a mainstay in the different stages of your training process?
3. In your sports field, how are studies valued?
4. In your sports field, what is the relationship between sport training and leisure time?
5. From the factors covered in social context, which do you consider to have been most crucial in your training process? (Education, studies, family, idols, means of communication, friends, boyfriend/girlfriend...)
6. How were these aspects addressed at the different stages of your training process?

#### SPORTS CONTEXT

1. How were the beginnings in the sport in which you ended as a professional?
2. At what age did you start training that sport seriously?
3. What would you consider to have been the greatest difficulties to overcome in the different stages of your training process?
4. How important was the club or clubs where you were trained?
5. Which role have sport specialists played, if any, at the different stages of your training process?
6. From the factors covered in sports context, which do you consider to have been most crucial in your training process? (source of young players, coordinators, starts, trainers, doctors, opportunities, coaches, psychologists, talent scout, representatives, body care, experience, sport of sport in general, facilities and talent...)
7. How were these aspects addressed at the different stages of your training process?

#### INTRA-INDIVIDUAL ABILITIES

1. How do you remember yourself during the different stages of your training process regarding intra-individual abilities? (level of activation, self-efficacy, learning ability, concentration, persistence, discipline, emotional balance, humility, motivation, pressure, initiatives, extroversion, mental strength and introversion...)
2. Were players with better intra-individual abilities the most distinguished in the lower categories?

3. From all intra-individual abilities, which do you consider to have been most crucial in your training process?
4. How were these aspects addressed at the different stages of your training process?

#### INTER-INDIVIDUAL ABILITIES

1. How do you remember yourself during the different stages of your training process regarding inter-individual abilities? (leadership, performed roles, socialization, empathy, solidarity, group connection, cohabitation, respect and comradeship...)
2. Were players with better inter-individual abilities the most distinguished in the lower categories?
3. From all inter-individual abilities, which do you consider to have been most crucial in your training process?
4. How were these aspects addressed at the different stages of your training process?

#### TACTIC

1. Were players with better tactics the most distinguished in the lower categories?
2. How do you remember yourself during the different stages of your training process regarding tactics? (making decisions, perception, polyvalence, offensive tactics actions without the ball, offensive tactics actions with the ball, defensive tactics and team systems and organization...)
3. From all different tactics, which do you consider to have been most crucial in your training process?
4. How were these aspects addressed at the different stages of your training process?

#### TECHNIQUE

1. Were players with better techniques the most distinguished in the lower categories?
2. How do you remember yourself during the different stages of your training process regarding techniques? (defensive abilities, abilities with motive and abilities without motive...)
3. From all different techniques, which do you consider to have been most crucial in your training process?
4. How were these aspects addressed at the different stages of your training process?

#### PHYSICAL ABILITIES

1. Were players with better physical abilities the most distinguished in the lower categories?

2. How do you remember yourself during the different stages of your training process regarding physical abilities? (resistance, speed, strength, flexibility, coordination, balance and agility...)
3. From all physical abilities, which do you consider to have been most crucial in your training process?
4. How were these aspects addressed at the different stages of your training process?

#### ANTHROPOMETRY

1. Were players with better anthropometric characteristics the most distinguished in the lower categories?
2. How do you remember yourself during the different stages of your training process regarding anthropometric issues? (body composition, size, height, weight and proportionality...)
3. From all physical abilities, which do you consider to have been most crucial in your training process?
4. How were these aspects addressed at the different stages of your training process?

#### SPORTSMAN'S EXPERTISE

1. Which characteristics must elite sport players have?
2. Which skills did you distinguish in at the different stages of your training process?
3. How many hours did you train a week at the different stages of your training process?
4. Did you train outside of regular training hours?
5. Do you remember the moment of your debut at the highest category?
6. Some of the players who were distinguished along their training process did not achieve the elite sport, what do you believe is the reason why?
7. Which recommendations would you give to a player who would like to achieve the elite?

### ANNEX III

#### AEPTP EXPERTS' INTERVIEW

Verifying, correcting and obtaining biographical data and labour and curricular background previously obtained by the interviewer about the interviewee.

#### SOCIAL CONTEXT

1. How must the family setting act in relation to the sportsman?
2. In this sports field, how are studies valued?
3. In this sports field, what is the relationship between sports performance and leisure time?
4. From all factors covered in the social context, which do you consider the most crucial in the sportsman's training process? (education, studies, family, idols, means of communication, friends, boyfriend/girlfriend...)
5. How should these aspects be addressed at the different stages of the sportsman's training process?

#### SPORTS CONTEXT

1. How important should be the source of young players in a sports club?
2. Which role must experts play at the different stages of player's training process?
3. Which method(s) must be used when designing player's different training sessions?
4. From all factors covered in the sports context, which do you consider the most crucial in the sportsman's training process? (source of young players, coordinators, starts, trainers, doctors, opportunities, coaches, psychologists, talent scout, representatives, body care, experience, sport of sport in general, facilities and talent...)
5. How should these aspects be addressed at the different stages of the sportsman's training process?

#### INTRA-INDIVIDUAL ABILITIES

1. Were players with better intra-individual abilities the most distinguished in the lower categories?(level of activation, self-efficacy, learning ability, concentration, persistence, discipline, emotional balance, humility, motivation, pressure, initiatives, extroversion, mental strength and introversion...)
2. How important are intra-individual abilities along players' training process?
3. From all intra-individual abilities, which do you consider the most crucial in the sportsman's training process?
4. How should these aspects be addressed at the different stages of the sportsman's training process?

### INTER-INDIVIDUAL ABILITIES

1. Were players with better inter-individual abilities the most distinguished in the lower categories? (leadership, performed roles, socialization, empathy, solidarity, group connection, cohabitation, respect and comradeship...)
2. How important are intra-individual abilities along players' training process?
3. From all inter-individual abilities, which do you consider the most crucial in the sportsman's training process?
4. How should these aspects be addressed at the different stages of the sportsman's training process?

### TACTIC

1. Are players with the best tactics the most distinguished in lower categories?
2. How important are tactics along players' training process? (making decisions, perception, polyvalence, offensive tactics actions without the ball, offensive tactics actions with the ball, defensive tactics and team systems and organization...)
3. From all tactics, which do you consider the most crucial in the sportsman's training process?
4. How should these aspects be addressed at the different stages of the sportsman's training process?

### TECHNIQUE

1. Are players with the best techniques the most distinguished in lower categories?
2. How important are techniques along players' training process? (defensive abilities, abilities with motive and abilities without motive...)
3. From all techniques, which do you consider the most crucial in the sportsman's training process?
4. How should these aspects be addressed at the different stages of the sportsman's training process?

### PHYSICAL ABILITIES

1. Are players with the best physical abilities the most distinguished in lower categories?
2. How important are physical abilities along players' training process? (resistance, speed, strength, flexibility, coordination, balance and agility...)
3. From all physical abilities, which do you consider the most crucial in the sportsman's training process?
4. How should these aspects be addressed at the different stages of the sportsman's training process?

## ANTHROPOMETRY

1. Are players with the best anthropometric characteristics the most distinguished in lower categories?
2. How important are physical abilities along players' training process? (body composition, size, height, weight and proportionality...)
3. From all anthropometric characteristics, which do you consider the most crucial in the sportsman's training process?
4. How should these aspects be addressed at the different stages of the sportsman's training process?

## SPORTSMAN'S EXPERTISE

1. Which characteristics must an elite sportsman have?
2. Due to which abilities a sportsman must be distinguished at the different stages of its training to achieve the elite?
3. How many hours a week must players train in each of the training stages to achieve the elite?
4. Should there be deliberate practice for a player to achieve elite sport?
5. Some of the players who were distinguished along their training process did not achieve the elite sport, what do you believe is the reason why?
6. Which recommendations would you give to a player who would like to achieve the elite?